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THE HISTORICAL PHONOLOGY OF THE TIWA LANGUAGES

George L. Trager

1. The Tiwa languages are spoken in the four pueblos of Taos, Picurís, Sandía, and Isleta in New Mexico. Taos and Picurís are in the northern part of the state, about 25 miles from each other, and about 75 miles north of Santa Fé. Sandía and Isleta are some 15 miles from Albuquerque, north and south respectively.

The geographical situation parallels the linguistic one, as will be evident from the data here presented. Taos (T) and Picurís (P) constitute Northern Tiwa (NoTi); they are mutually intelligible, though having rather important phonetic, phonemic, and morphological differences. Sandía (S) and Isleta (I) are really but two dialects of a single Southern Tiwa (SoTi) language, having very few differences between them, and these chiefly in details of phonetics.

For the further relations of Tiwa to Tewa and Towa, forming the Tanoan family of languages, and to Uto-Aztecan to form the Azteco-Tanoan stock, see B. L. Whorf and G. L. Trager, 'The relationship of Uto-Aztecan and Tanoan', American Anthropologist 39.609-24 (1937).

2. Taos has the following phonemes: /p, t, c [č], k, k_w, ʔ, p', t', c', k', k_w', p', t', ɬ, s, x, x_w, h, b, d, g, m, n, l, w, j/; /r/ occurs in foreign words only; /i, e [ɛ], a [a^], o [ɒ], ə [ʌ*], u, ɨ, ę, ą, ǫ, ų/; /'/ loud stress, /,/ medial (secondary) stress, weak stress unmarked; normal (middle and level) tone unmarked except by the stresses, /´/ high tone, /`/ low tone. The two-vowel monosyllabic clusters are: /ie, ia, əo, uo, ɨę/. There are no initial consonant clusters, and every syllable begins with one consonant; besides the vowels only /b, d, g/ (these being then phonetically voiceless lenis unreleased), /m, n, l, w, j/ can end syllables. Weak-stressed syllables are only normal-toned; high- and low-toned syllables are loud or medial according to a complex set of rules

involving sequence in relation to other loud or medial stresses.

Picurís phonemes are: /p, t, c, k, k_w, ʔ, p', t', c', k', k'_w, pʻ, tʻ, ɬ, s, x, x_w, h, m, n, l, w, j; r; i, e [e], a [ɑ<], ə [ʌ^], o [o], u, i̧, ȩ, a̧, ə̧, o̧, u̧; ', ,, [weak], ´, `/. The only vowel cluster is /ia/, never occurring with weak stress. Of the consonants, /m, n, l, w, j/ may be syllable-final, and there are also instances of /p/, though not of /t/ or /k/. Tone and stress combinations are as in Taos.

Sandía and Isleta both have the same phonemes (with one exception), though there are specific words in which different distributions of them occur: /p, t, c, k, k_w, ʔ, p', t', c', k', k'_w/ (not in Isleta), /pʻ, tʻ, kʻ, ɬ, s, š, h_w, h, b, d, g, m, n, r, w, j/; /l/ is foreign only; /i, e [ɛ], a [ɑ<], ə [ ]* u, i̧, ȩ, a̧, ə̧, u̧; ', ,, [weak], ´, `/. Vowel clusters are: /ie, əa, ua, i̧ȩ, ə̧a̧/, and /ia/ in Sandía only and /u̧a̧/ in Isleta only. The same consonants as in Taos can occur in syllable-final, /b, d, g/ being phonetically voiceless lenis affricates or spirants in this position, while they are voiced stops initially and voiced spirants medially. Tone and stress combinations are as in Taos, but there are very many fewer weak syllables.

Correction — for: ə [ ] read: ə [ɯ̥]

3. The reconstruction of Proto-Tiwa (PTi) is illustrated by the following numbered list of examples, in order of the phonemes as given for Taos. Complete words are given, but stems are separated from suffixes and prefixes by hyphens. The order of languages is T, P, S, I. The meaning is given only once, unless there are differences. Following the words compared is a reconstructed form, usually a stem only, marked by an asterisk; there being no danger of confusion here, the slant lines otherwise enclosing phonemic orthography are omitted.

(1) p: p'ojuo 'three', p'acu, p'acua, p'acua: *p'oǰuo.

(2) t: tob'u-na 'governor of pueblo', tap'o-ne, tab'u-jde, tab'u-de: *tob'u-ra.

(3) c: c'iw-ena 'eagle', c,iw-'ene, š'iw-ide, š'iw-ide: *c'iw-era (P stress differs).

(4) k: k'a-na 'mother', k'ia-ne, k'ia-jde, k'e-de: *k'a-ra.

(5) k_w: k_w'il-a̧ 'he closed', k_w'el-ene 'lock', k_w'ir, k_w'ir: *k_w'il-.

(6) ʔ: ʔòd-'enema̧ 'chin, jaw', ʔàn-ʔemǫ́, ʔ'ad, ʔ'ad: *ʔod- (stress and tone doubtful).

(7) p': p'ò-ʔ'one 'water', p'à-ʔ'aną́, p'à, p'à: *p'ò-.

(8) t': t''oj-na 'person, Indian', t''aj-ʔene, t''aj-de, t''aj-de: *t''oj-.

(9) c': c'èo-ʔ'onemą 'face', c'è-ʔ'əmǫ́, c''əa, c''əa: *c'əa (tone?).

(10) k': k''əo-nemą 'neck', k''ə-ʔəmǫ́, k''əa, k''əa: *k''əo.

(11) k_w': k_w'aj'a-na 'magpie', k_w'iac'ia-ne, k_w'er'a-jde, k_w'ar'a-de: *k_w'aǰ'a-ra.

(12) p': p''aj-wi 'it is red', p''aj-wé, p''ej, p''ej-mų: *p''aj-.

(13) t': t'ùl-'ena 'sun', t'òl-'ene, t'ùr-'ide, t'ùr-'ide: *t'ùl-'era.

(14) ł: łìw-'ena 'woman', łìw-'ene (łìw-l'a-ne 'wife'), łìwr'a-jde, łìw-ʔ'ide 'wife' (łìwr'a-de 'woman'): *łìw-(l'o)-.

(15) s: s'əon-ena 'man', s'ən-ene, s'əan-ide, s'əan-ide: *s'əon-era.

(16) x: x'o-nemą 'arm', x'a-ʔemǫ́, k''a, k''a: *k''o-.

(17) x_w: x_w'ili 'eight', x_w'ele, h_w'iri, h_w'iri: *x_w'ili.

(18) h: h'ili 'what', h'ele, h'iri, h'iri: *h'ili.

(19) -b: pòb-'enemą 'flower', pàm-ʔemǫ́ (also pàp- in compound names of persons), nąpàb, nąpàb: *pòb-.

(20) -d: d, n, d, d — see (6): *d.

(21) -g: -ʔogą 'in' (place where), ?, -ʔag, -ʔag: *-ʔog(ą).

(22) m: mų 'he saw', mǫ, mų, mų: *mų.

(23) m: màw 'he wanted', m'iaw-, b'ew-mų, b'ew-: *b'aw- (Taos tone doubtful).

(24) n: -ną plural absolute suffix of nouns of gender I, -né, -n, -n: *-ną (P tone is secondary).

(25) n: -na singular absolute suffix of nouns of gender I, -ne, -jde, -de: *-ra.

(26) -l: k''ol(ą) 'he ate', k''al, k''ar(ą), k''ar: *k''ol(ą).

(27) l-: l'ilu-na 'hen', l'el'o-ne, d'iru-jde, d'ir'u-de: *d'ilu-.

(28) w: w'i-ʔiną 'two', w'e-ʔesen, w'i-si, w'i-si: *w'i-.

(29) j: j'ų-na 'this one', j'ǫ-, j'ų-de, j'ų-de: *j'ų-ra.

(30) j: j, c, c, c — see (1): *ǰ.

(31) j after medial stress before loud stress: j, c, r, r — see (11): *ǰ.

(32) i: i, e, i, i — see (5), (17), (18), (27), (28): *i.

(33) i before w: i, i, i, i — see (3), (14): *i.

(34) i: pʻìw-'ena 'daughter', pʻìw-'ene, pʻìew-'ide, pʻìw-ʔ'ide: *pʻìew-.

(35) e: e, ẹ, i, i, in -e-na, etc., noun-formative — see (3), (13), (15): *e.

(36) a with either strong stress: a, ia, e, e (a after u) — see (11) (first syllable), (12), (23): *a.

(37) a before *r (see (25)): a, ia, ia, e — see (4): *a(r).

(38) a after *ǰ (see (31)): a, ia, a, a — see (11) (second syllable): *(ǰ)a.

(39) a with weak stress: a, e, e, e — see (2), (3), (4), (8), (11), (13), (14), (15), (27), (29), (43), (50): *a.

(40) a before *j: a, a, e, e — see (12): *a(j).

(41) o: o, a, a, a — see (1), (2), (6), (7), (8), (14), (16), (19), (21), (26): *o.

(42) ə: ʔə̀-na 'leaf', ʔə̀-, nạ-ʔə̀, nạ-ʔə̀: *ʔə̀-.

(43) ə: p''əj-na 'nose', p'ˌạj-'ene, p''ạj, p''ạj: *p''ạj-.

(44) u: u, o, u, u — see (2), (13), (27): *u.

(45) u before *j: p'uj-ena 'friend', p'uj-ene, p'uj-de, p'uj-ʔide: *p'uj-.

(46) ie: k_w'iem- 'maiden' (form found in texts, probably archaic), k_w'in- (a form not recorded by me but found in Harrington's texts [BAE, Report 43, 1928], with stress unmarked), —— , k_w'iem-ʔù 'little girl': *k_w'iem- (P -n- perhaps an error).

(47) ia: p''ian-enemạ 'mountain', p'ˌin-'ene, p''ien, p''ien: *p''ian-.

(48) əo: əo, ə, əa, əa — see (9), (10), (15): *əo.

(49) uo: uo, u, ua, ua — see (1): *uo.

(50) ị: mị̀m'i-na 'maternal uncle', ? (mị̀m'ine 'cousin' is a loanword because of -'i- instead of the expected -'e-; *ị probably became ẹ in Picurís), mẹ̀m'e-jde (e < i by assimilation?), mẹ̀m'e-de: *mị̀m'i-ra.

(51) ẹ: ʔé 'you' (sg. and pl.), ʔé, ʔí, ʔí: *ʔé.

(52) ạ: ʔ'ạ-si-mạ 'it is sweet', nạ-ʔ'ạ, ʔ'ạ-m, ʔ'ạ-m: *ʔ'ạ-.

(53) ạ final weak-stressed after -em-: -mạ, -mǫ́, lost in S and I, — see (6), (9), (10), (16), (19). After -n- in P, see (24).

(54) ạ: ʔ'ạ-nemạ 'blood', ʔ'ạ-ʔenḗ, ʔ'ẹ̀ạ, ʔ'ẹ̀ạ: *ʔ'ẹ̀ạ-.

(55) ǫ: x'ǫ-nemạ 'name', x'ạ-ne, k''ạ, k''ạ: *k''ạ-.

(56) ụ: ụ, ǫ, ụ, ụ — see (29): *ụ.

(57) ị̀ẹ: p''ị̀ẹ-na 'road', ——, p''ẹ, p''ẹ: *p''ị̀ẹ; T ɬ'ị̀ẹ-wẹ 'he chewed', P ɬ'ị-wẹ: *ɬ'ị̀ẹ-wẹ.

(58) ': all alike except for differences of suffix, above passim.
(59) ,: all alike except for alternation with ', see (11), (27).
(60) weak stress: final weak-stressed syllables remain in T and P, but in P sometimes get high tone, as in -nę́ (7), (24), and -mǫ́ (6), (9), (10), (16), (19). In S and I some weak-stressed syllables remain, but many are lost, the conditions being as yet unknown to me.
(61) ´: alike in all — see (51).
(62) `: alike in all — see (7), (13), (14), (19), (22), (34), (50); (6), (9), and (23) probably include errors in recording.

This list contains all the 'phonetic laws' or statements of phonemic correspondences summarizing the historical phonological development of the Tiwa languages, with the exception of a few phenomena in affixes where my evidence is too scanty to permit any definite conclusions.

All the correspondences are based on a number of examples (from a few with a minimum of two instances to many with several dozens), with the exception of those about to be mentioned. The large number of examples in most cases guarantees the probability of correctness of the few correspondences for which evidence is limited. The statement about the number of examples does not mean that there is always a cognate in each of the four languages; but there are enough instances of all four, and many more with three or two.

Formula (11) shows two unique correspondences: the word cited is one of two, in T and S, having the phoneme /$k^{\prime}_{w}$/, and the only one in P (as far as my recordings show, of course); the phoneme is apparently on its way out, and has indeed been lost in I; the nature of the word in question is such as to make it fairly certain, however, that the correspondence is real, as it is not merely the word for a 'magpie' but occurs frequently in tales for the mythological Magpie. The correspondences of the second consonants in the word, /j : c : r : r/, is also illustrated by no other instance; in (1) we have the normal correspondence reconstructed as /*ǰ/, namely /j : c : c : c/; the formula in (11) shows the same correspondences for T and P, and it is for this reason and because there is no possibility of confusion that we reconstruct it also as /*ǰ/; but it may well be that this was some other, defective, phoneme.

Formula (21) is the only one for /*g/, and as is seen, does not

show anything for P. But the fact that /g/ exists in T, S, and I (loan words with it occur, and offer no apparent difficulty), and the nature of this one example—a local particle of frequent use in the form given and in combination with others—seems to guarantee the validity of the formula.

Formula (25) is the only one that sets up /*r/, but it occurs extremely frequently as a matter of statistics: the gender-class numbered I—exemplified in (2), (3), (4), (8), (11), (13), (14), (15), (27), (29), (50)—is one of three in T and P, and there includes all animates and apparently a few other words; in S and I the cognate words have the absolute suffix, and constitute a gender-class. The other two genders of T and P, II and III, are distinguished from each other in their absolute suffixes and by the prefixes of pronominal reference in the verb and in possession, but both include words with all kinds of meanings (except animates); in S and I, however, the cognates of these words all appear as stems without absolute suffix, and I have not sufficient evidence to say whether in pronominal reference they constitute one class or two; examples of II are in (6), (9), (10), (16), (19), (47), (54), (55); of III, in (7), (42), (43), (57).

Formula (27) shows one of two examples of initial /*d/, but /*d/ elsewhere is well attested (6).

Formulas (34) and (46) are the only evidence for /*ie/, which is thus not very firmly established.

Formula (43) is the only example for /*ə̨/. Formula (54) is one of only a few examples of /*ə̨ə̨/.

4. The following table summarizes the development of PTi phonemes in the four Ti languages. The numbers refer to the examples in §3.

PTi	T	P	S	I
*p (1, 45)	p	p	p	p
*t (2)	t	t	t	t
*c (3)	c	c	š	š
*k (4)	k	k	k	k
*k_w (5, 46)	k_w	k_w	k_w	k_w
*ʔ (6)	ʔ	ʔ	ʔ	ʔ
*p' (7, 47, 57)	p'	p'	p'	p'

PTi	T	P	S	I
*t' (8)	t'	t'	t'	t'
*c' (9)	c'	c'	c'	c'
*k' (10, 26)	k'	k'	k'	k'
*k'_w (11)	k'_w	k'_w	k'_w	k'u
*p' (12, 43)	p'	p'	p'	p'
*t' (13)	t'	t'	t'	t'
*k' (16, 55)	x	x	k'	k'
*b (2, 19, 23)	m- (23), -b- (2, 19)	m- (23), -p- (2), -m(?-p) (19)	b	b
*d (6, 27)	l- (27), -d- (6)	l- (27), -n (6)	d	d
*^{y}j (1, 11)	j	c	c (1), ,-r'- (11)	c (1), ,-r'- (11)
*g (21)	g	?	g	g
*ɬ (14, 57)	ɬ	ɬ	ɬ	ɬ
*s (15)	s	s	s	s
*x_w (17)	x_w	x_w	h_w	h_w
*h (18)	h	h	h	h
*m (22, 46, 50)	m	m	m	m
*n (15, 24, 47)	n	n	n	n
*l (5, 13, 14, 17, 18, 26, 27)	l	l	r	r
*r (2, 3, 4, 8, 11, 13, 14, 15, 25, 27, 29, 50)	n	n	jd	d
*w (3, 14, 23, 28, 34)	w	w	w	w
*j (8, 12, 29, 43, 45)	j	j	j	j
*i (3, 5, 14, 17, 18, 27, 28, 50)	i	e, i(w) (3, 14)	i, ?e (50)	i, ?e (50)
*e (3, 13, 15)	e	e	i	i
*a (2, 3, 4, 8, 11, 12, 13, 14, 15, 23, 25, 27, 29, 50)	a	'ia (4, 11), a(j) (12), e (2, etc.)	e, ia(j) (4)	e
*o (1, 2, 6, 7, 8, 14, 16, 19, 21, 26)	o	a	a	a
*ə (42)	ə	ə	ə	ə
*u (2, 13, 27, 45)	u	o, u(j) (45)	u	u

PTi	T	P	S	I
*ie (34, 46)	i, ie (46)	i	ie	i, ie (46)
*ia (47)	ia	i	ie	ie
*ɔo (9, 10, 15)	ɔo	ɔ	ɔa	ɔa
*uo (1)	uo	u	ua	ua
*ɨ (50)	ɨ	ʔę	ę	ę
*ę (51)	ę	ę	ɨ	ɨ
*ą (6, 9, 16, 24, 52, 53)	ą	ą (52), (-m)ǫ́ (6, 9, 16), (-n)ę́ (24)	ą	ą
*ǫ (55)	ǫ	ą	ą	ą
*ə (43)	ə	ə	ə	ə
*ų (29)	ų	ǫ	ų	ų
*ɨę (57)	ɨę	ɨ	ę	ę
*əą (54)	ą	ą	əą	əą

The tones and stresses are illustrated in all the examples, and remain unchanged except for the loss of weak syllables in S and I, and the development of high tone on final -nę́, -mǫ́ in P.

5. The correspondences in the table show clearly that S and I have developed practically identically, and are clearly different from T and P. The latter two show greater differences between themselves, but are on the whole much alike.

The PTi unaspirated stops /*p, *t, *k, *k_w, *ʔ/ have remained unchanged in all the languages, but /*c/ has become a spirant in S and I. This, in connection with some Tewa evidence that is at best in the 'hunch' class, may mean that Proto-Tanoan had both /*c/ and /*c'/, and that the two fell together into one unaspirated phoneme in NoTi, while becoming an aspirated one in SoTi, ending up there as a spirant; this spirant character is not surprising, as SoTi /p', t', k'/ are phonetically spirants at least as often as they are aspirated stops.

The PTi glottalized stops /*p', *t', *c', *k', *k'_w/ have remained unchanged, except that the last has disappeared in I, giving /k'u/, the /u/ combining with a following vowel, whatever its original value, to form the vowel-cluster /ua/.

The PTi aspirated stops /*p', *t', *k'/ have remained in SoTi, but are, as noted, often spirants or affricates phonetically. There

is some Tewa evidence for an original /*$k_w^{\prime}$/, but there is no way of determining whether the existing NoTi /x_w/ and SoTi /h_w/ may represent this in part or not.

The voiced stops /*b, *d/ remain unchanged as phonemic entities in SoTi, but are phonetically voiced spirants between vowels, and voiceless lenis affricates or spirants in final position. In NoTi they were more unstable, and became /m, l/ initially; internally they remained in T, but are voiceless lenis unreleased stops in syllable final position; in P they became /m, n/ in syllable final, and /p/ and apparently /t/ (this is based on some uncertain morphological evidence not cited in this article) between vowels; the evidence for syllable final /p/ from /*b/ in P is not certain. All the evidence for /*g/ is too meager for certainty (some of it is morphological). The evidence for /*ǰ/ is plentiful in general, but the equation /j : c : r : r/ is, as has been said, supported by only one etymology.

The spirants /*ɬ, *s, *x_w, *h/ remain unchanged. The writing /h_w/ in SoTi is convenient because there is a morphophonemic alternation with /h/, while in NoTi the alternation is with /x/.

The nasals /*m, *n/ did not change. The original of NoTi /l/ and SoTi /r/ may have been, of course, either [l] or [r]; it is convenient to write it /*l/, as that seems to be the correspondence in Tewa. The semivowels /*j/ and /*w/ remained. Nothing can be said about the phonetic nature of the reconstructed /*r/, which was at best a defective phoneme in distribution.

The vowels have remained unchanged in T except for the elimination of /*ą/, which was probably very rare, and the apparent change of /*ie/ to /i/ in some cases. In P all the vowel clusters have become single vowels, the original first element being the one remaining (except that /*ąą/ has become /ą/), while all the other vowels have changed in quality—the high vowels becoming higher mid, the mid vowels becoming somewhat lower, low front being raised or diphthongized, and low back being unrounded. In SoTi the six vowels have been reduced to five; the apparent reversal of qualities in the two front nasals /*į/ and /*ę/, giving /ę/ and /į/, is puzzling.

Considering the changes as indications of the stability of the original phonemes, we see that the voiced stops were least stable, the glottalized ones most so, of the consonants; and that the low

vowels were least stable, the high vowels most so, and the vowel clusters more likely to change than the single vowels. The prosodic phonemes seem to have remained the same, and even the loss of weak syllables in SoTi may not be due entirely to phonological changes, but may have resulted in part from morphological and syntactic ones.

6. The usefulness of such a partial study as the present one lies in its presentation of the formulas of correspondence which any linguist can use in looking for cognates of Tiwa words in the other branches of Tanoan, or in Azteco-Tanoan, or elsewhere. If his Tiwa evidence is available at least for one language in each of the two branches, he can be sure of arriving at the correctly reconstructed PTi form for use in making the comparison.

When complete descriptive grammars of each of the Tiwa languages become available, it will be possible to extend the list of formulas here given to include those covering affixes which now seem not to fit into the comparisons stated here, and it may be that some special and rare correspondences will become evident. But it is certain that there will be no change in the correspondences established now. Reconstruction of Proto-Tanoan is of course possible only in a preliminary way, until the several Tewa dialects and Towa have been described. But a linguist who will obtain, for Tewa and Towa, a list of several hundred stems including all the words listed here, and in addition all the numerals, kinship terms, and words for common objects, will have enough to make certain the main correspondences on which Proto-Tanoan must be based. It is possible to say now, with the poor Tewa evidence available, that the preliminary reconstruction of Tanoan used in the Whorf-Trager article referred to above is essentially correct.

Yale University [May 9, 1942]